

GAFSP Proposal – Haiti 2016 – Technology Transfer Program for Small Farmers (PTTA II)

Part 1: Summary of Overall Agriculture and Food Security Strategy and Associated Investment Plan

1.1 Overall sector strategy, investment plan, and past performance

1.1.1 Overall agriculture and food security strategy objectives and alignment with the Sustainable Development Goals

Food security in Haiti is strongly dependent on the agricultural sector. The measures and orientations adopted by the Haitian State to ensure food security are defined in the different national policy frameworks, and in particular: (i) the National Food and Nutritional Security Plan, updated in 2010, which aims at eliminating food insecurity for all Haitians by the year 2025; and (ii) the Agricultural Development Policy Document for the 2010-2025 period. This policy, defined in 2010, establishes the general provisions and major orientations for the development of the agricultural sector for a period of 15 years, in order to contribute in a sustainable manner to the food needs of the population and the country's economic and social development. Its specific objectives are listed in Table 1.

Table 1. Specific Objectives of Agricultural Development Policy

1. Coverage of national consumption through local production increases from 45% to 70%.
2. The agricultural sector is composed of approximately 500.000 farms that provide a decent income to farmers.
3. The ratio of value of agricultural exports over imports increases from « 5% » (2009 figure) to 50% by 2025.
4. The proportion of land planted in annual crops on mountain slopes is strongly reduced.

Interest in the development of the agricultural sector was emphasized in various government documents following the 2010 earthquake, specifically in the Action Plan for Economic Revival and Development of Haiti and in the Strategic Plan for the Development of Haiti in 2011 (PSDH, its French acronym). The agricultural sector is included in one of its four priority areas, « rebuilding the economy », as a central element for the country's stability and as a vital axis for its development.

These orientations were further developed by the Government of Haiti and its development partners in the National Agricultural Investment Plan (NAIP) for the period 2010-2016. This document outlines the framework for the operational planning of interventions in the agricultural sector. It is built around the following strategic objectives: (i) increase local production of basic foodstuffs in order to provide food security for the population (in accordance with the National Food and Nutritional Security Plan); (ii) increase farm revenue; (iii) increase foreign exchange earnings; (iv) improve the health and nutritional situation of the Haitian population, particularly for vulnerable groups; and (v) reduce vulnerability to natural disasters.

The NAIP was prepared after the earthquake which struck Haiti in 2010 and includes both short-term interventions aimed at responding directly to the impact of this catastrophic event and mid and long-term interventions. These activities are organized around three main axes:

- development of rural infrastructure, including watershed management, forestry, and irrigation;
- production and development of value chains, specifically animal husbandry, fishing and food crops;

- agricultural services and institutional support, combining agricultural extension, land tenure, animal and plant health, quality control, product traceability, and institutional support for agricultural services.

The total amount of the planned investments was approximately \$US 791 million dollars for the six year period, or an average of the order of US\$ 130 million per year.

These policy documents (including the new national agricultural investment plan for the 2016-2021 period, presented in paragraph 1.1.4) take into account the Sustainable Development Goals (SDG) and will contribute specifically to achieving the following: **SDG1** - End poverty in all its forms everywhere; **SDG2** - End hunger, achieve food security and improved nutrition and promote sustainable agriculture; **SDG13** - Take urgent action to combat climate change and its impacts; **SDG15**: Protect, restore and promote sustainable use of terrestrial ecosystems.

1.1.2 Overview of results of the evaluation of the implementation of the 2010-2016 National Agricultural Investment Plan and measures considered to mitigate shortfalls

The National Agricultural Investment Plan expired in 2016 and its evaluation has been conducted to analyze its implementation and build the foundations for elaborating a new NAIP for the 2016-2021 period.

a) Overview of the results of the 2010-2016 NAIP

Out of the USD 791 million planned to be invested, 593 have actually been invested, representing 75% of the planned investment. The summary assessment acknowledges significant progress in the areas of rural infrastructure development, enhancement of value chains and institutional strengthening. The NAIP has provided a basis to fund several projects that have been completed or are currently ongoing.

These projects have focused on several priorities, among which: watershed management, irrigation infrastructure, agricultural extension, and support for agricultural services. These projects are in large part financed by donors that have participated in validating the NAIP.

The Government has allocated funds for large scale activities in the agricultural sector in order to create favorable conditions for private investment (irrigation infrastructure, feeder roads, animal and plant protection, etc.). Funds allocated to the Ministry of Agriculture for programs and projects have increased in nominal value over the NAIP implementation period, but nevertheless remain limited in comparison to the needs of the sector. The measures that were established during the period of implementation of the NAIP have on the other hand encouraged several new investments by the private sector in crop production, animal husbandry and aquaculture.

However, the level of appropriation of the 2010-2016 NAIP remains weak, notably within Non-Governmental Organizations and certain entities of the Ministry of Agriculture at the departmental level, as well as within certain line ministries. Certain projects with local funding are thus not entirely aligned with the NAIP in terms of their objectives and expected outcomes.

With respect to the execution of the NAIP, a major constraint has been the lack of appropriate resources allocated to the Ministry of Agriculture and the timing of disbursements for implementing appropriate activities. In addition, certain donors define their own priorities, sometimes without consideration for the basic needs of the sector or for the priorities established by the State. Instability at the senior management level of the Ministry of Agriculture, with frequent staff changes, is also a source of difficulties in implementing plans.

b) Measures considered to mitigate shortfalls

The necessary measures include:

- Using of simultaneous top-down and bottom-up approaches in both the definition and implementation of the NAIP so as to promote participation and appropriation of all stakeholders;
- Encouraging complementarity in operations and promoting synergies between actors. Proper consultation with the Ministry of Planning and the Ministry of Economy and Finance is essential, as these entities are those who define annual budget allocations for the Ministry of Agriculture;
- Relying on rigorous methods for identification, design and selection of projects financed through the government's Public Investment Program in order to guarantee consistency with the strategic objectives established in the NAIP.

1.1.3 New NAIP to achieve objectives (components, activities, indicative cost)

The new 2016-2021 NAIP is strictly in accordance with agricultural development policy guidelines and is focused on three areas:

- Agricultural infrastructure and watershed management, aimed at increasing availability and productive use of water in the plains as well as in the mountain areas;
- Development of crop production, animal husbandry and fisheries, including direct support for enhancing value chains and increasing production;
- Agricultural services, in order to create a favorable environment for investments, improve governance and ensure greater efficiency for public investments in the sector.

Funding requirements for the 2016-2021 NAIP are estimated at USD 796 million. They are detailed in Table 2.

Table 2: Breakdown of costs for the 2016-2021 NAIP

Area of Intervention	Total required funding ('000 USD)	%
1. Agricultural Infrastructure and Watershed Management		
1.1. Irrigation	283,500	36
1.2. Watershed management	140,706	18
2. Development of crop and animal production and fisheries		
2.1. Animal husbandry	51,500	6
2.2. Aquaculture and fisheries	30,647	4
2.3. Crop Production (including machinery and equipment)	120,328	15
2.4. Support for marketing facilities and agricultural processing	46,500	6
3. Development of agricultural public services		
3.1. Research, training and extension	67,644	8
3.2. Plant and animal health	24,821	3
3.3. Agricultural credit	25,000	3
3.4. Institutional Strengthening	5,625	1
Total	796,274	100

Irrigation plays a major role in improving agricultural production and accounts for 36% of the funding needs. Watershed management will make use of various approaches and methods (agroforestry, reforestation, mechanical and biological structures) and absorbs approximately 18% of the NAIP budget. Development of value chains also represents an important share of the NAIP budget. Support for crop production accounts for 15% of the budget and will be used to supply farmers with the necessary inputs for agricultural intensification in the new or rehabilitated irrigated areas and other zones with high production potential. The budget for "Development of agricultural public services" amounts to 15% of the planned expenditures.

1.1.4 Monitorable framework and indicators

Monitoring and evaluation will use impact and output indicators.

Main impact indicators include:

- Annual rate of growth of Gross Agricultural Domestic Product;
- Prevalence of food insecurity.
- Ratio of agricultural exports/food imports;
- Productivity of land;
- Rate of increase of farm household income.

Main output indicators include:

- Area covered by newly constructed irrigation systems;
- Area with protective structures in the upper watersheds;
- Number of hectares under cultivation with improved technical packages;
- Number of private sector operators involved in sales of agricultural machinery and inputs;
- Number of fish aggregating devices in operation;
- Number of fish ponds;
- Number of regional service and agricultural innovation centers rehabilitated;
- Number of agricultural technical schools reopened.

1.1.5 Share of investment plan being financed by source, and estimated financing gap

The projected share of costs for the NAIP to be supported by different actors involved in the agricultural sector is presented in Table 3. The planned contributions for the implementation of the NAIP, for a total of USD 796 million, include contributions from the Government of Haiti for 22% of this amount, donors for 19% and a 6% coming from the private sector. Approximately 53% of the NAIP budget is not yet covered by planned contributions and additional sources of funding will have to be identified. The estimate of the Government's contribution is based on budget allocations for previous years and on its share of costs in ongoing projects in the country.

Table 3: Projected share of 2016-2021 NAIP budget by source of funding ('000 USD) and estimated funding deficit.

Area of intervention	Total Budget	GOH	Committed by Donors	Private Sector	Funding deficit
1. Agricultural infrastructure and watershed management					
1.1. Irrigation	283,500	30,769	28,930	0	233,801
1.2. Watershed management	140,706	42,307	44,361	0	54,038
2. Development of crop production, animal husbandry and fisheries					
2.1. Animal husbandry	51,500	7,692	500	30,000	13,308
2.2. Aquaculture and fisheries	30,647	7,350	14,701	3,000	5,596
2.3. Crop production (support for value chains)	120,328	53,846	30,358	10,620	25,504
2.4. Support for marketing and	46,500	13,846	1,500	0	31,154

processing					
III. Development of agricultural services and institutional strengthening					
3.1. Research, training and extension	67,644	11,538	19,232	0	36,874
3.2. Plant and animal health	24,821	1,518	8,555	0	14,750
3.3. Agricultural credit	25,000	7,692	350	0	16,958
3.4. Institutional strengthening	5,625	1,250	380	0	3,995
TOTAL	796,274	177,810	148,867	43,620	425,977
%	100	22	19	6	53

1.2 Key elements of the policy environment

In Haiti, agricultural public policies to can be summarized in four main categories:

- Access to agricultural inputs. The GOH facilitates access to fertilizers and seeds to agricultural producers. Government support for input supply is provided through the fertilizer subsidy program, the seed program and other donor-funded projects;
- Development and rehabilitation of agricultural infrastructure. The main intervention of the MARNDR in this area is the rehabilitation of irrigation infrastructure;
- The provision of basic agricultural services, including knowledge generation and transfer, agricultural health services, and land administration;
- Agricultural trade policy. Since 1995, Haiti has become the most open country in the region by liberalizing its market by significantly reducing customs barriers. Customs duties therefore vary from 0 to 15%.

According to the IDB Agrimonitor database, total support to the agricultural sector represented, on average, 5,3% of GDP in the period 2006-2012, but only 3.2% of the resources are allocated to finance public goods (the lowest level in LAC, and equal to to El Salvador), although such public spending has proven higher economic return rates than expenditures directed to the financing of private goods (Anriquez et al., 2016). This underinvestment inhibits investment in and profitability of the agricultural sector through the following factors:

- Vulnerability to agricultural pests and diseases. The Haitian veterinary and phytosanitary services are the weakest in the region, with “performance scores” of 1.58/5 and 15%/100% respectively (rating by OIE 2010 and IICA 2011).
- Limited farmers’ access to technologies. Most Haitian farmers are confined to non-profitable and environmentally unsustainable agricultural practices. Limited access of farmers to improved technologies mainly results from: (i) the insufficient availability of improved agricultural technologies, via the lack of effective agricultural applied research; (ii) the lack of a permanent and affordable supply of agricultural goods and services, due to the absence of a competitive network of private providers, crowded out by the distribution of subsidized inputs; and (iii) lack of credit.
- Inefficient use of water resources. In the absence of a solid policy, institutional and legal framework, including all stakeholders, public investments to improve water management cannot result in an effective and sustainable water service to farmers.
- Weak sector institutions. The MARNDR presents cross-cutting weaknesses, such as: difficulties to set priorities through sound sector policies; weak planning, programming and budgeting capacities; and limited results-based culture, accountability mechanisms and monitoring and evaluation skills.

- Land tenure insecurity. 60% of all privately owned parcels actually lack a formal property title, which leads to land tenure insecurity. This situation results from costly procedures, obsolete laws, and the absence of coordination of the numerous actors in charge of land administration services.

Comprehensive reforms in the key areas mentioned would improve agricultural productivity and competitiveness in Haiti. In recent years, the GoH has progressed in each of those components, as detailed below.

- Public agricultural health services. The first step was the approval of a results-based operational plan. The next challenges are to prepare the legal and regulatory framework, establish an appropriate institutional scheme, and design and implement a medium-term programmatic plan for the effective and efficient provision of agricultural health services, in accordance with international standards.

- Farmers' access to technologies. A two-fold strategic approach was proposed to address the limited access of farmers to improved technologies: (i) create a legal and policy framework for a modern agricultural research system in the country, capable of generating, validating and transferring technology; and (ii) expand progressively the incipient market-friendly system of smart subsidies for promoting the adoption of agricultural technologies, reducing the distribution of subsidized inputs to avoid the crowding out of private suppliers.

- Water resources and hydraulic infrastructures management. The GoH made substantial progress in improving the policy, institutional and legal framework for a better water resources management. The MARNDR (i) approved a new National Irrigation Policy; (ii) developed a programmatic plan to implement the new policy; (iii) prepared a draft bill. Remaining challenges include: (i) the modernization of the institutional and legal framework for an effective, efficient and sustainable management of water and infrastructures in the Artibonite Valley; (ii) the strengthening of the inter-institutional coordination mechanisms; and (iii) the adoption of the new legal framework by Parliament.

- Institutional reform of the Ministry of Agriculture. The MARDNR created a procurement unit to improve its capacity to absorb and administer financial resources. The "Studies and Programming Unit" (UEP) was staffed with high-level professionals, and launched the preparation of programmatic plans, with the objective to rationalize budget preparation. The MARNDR's challenge is to drive a comprehensive reform, aiming at orienting its human and financial resources to the effective and efficient provision of agricultural public services.

- Land administration. The GoH prepared a draft bill that includes, among other improvements, the right to use modern technologies to conduct land surveys and notary acts more efficiently. Remaining challenges include: (i) the approval of a comprehensive Land Administration Policy, to clarify new institutional arrangements and repartition of roles among the stakeholders involved in land administration; and (ii) additional modifications to the legal framework, that aims to provide legal force to the institutional arrangements defined in the new Policy; simplify land registration procedures, eliminate current notaries and surveyors rates; and give legal value to digital documents.

1.3 Government commitment to agriculture and food and nutrition security

Agriculture and food security have consistently been stated as priorities for public sector interventions in Haiti, at both the national and sectorial level, as discussed in previous sections. The Government's financial commitments in favor of the agricultural sector for the past years are presented in Table 4.

Table 4. Public Investments in Agriculture

Year	Public Investment Program Total (Gourdes)	Public Investment Program Allocations for Agriculture (Gourdes)	% Agriculture
2012-2013	87,501,255,303	9,215,969,711	11
2013-2014	68,702,047,380	6,142,354,404	9
2014-2015	66,623,084,995	6,663,168,509	10
2015-2016	56,843,830,801	10,829,285,861	19

These figures show that the relative value of these commitments represent a significant share of total public investment for the past years. They appear insufficient however to cover the financial needs of the sector. Furthermore, other constraints linked to existing institutional mechanisms affect the timely disbursement of funds and have negative impacts on the effectiveness and the efficiency in the use of budgetary allocations. Budget execution at the Ministry of Agriculture usually reaches 60-70%.

Poverty reduction is a policy priority and absorbs an important share of the three year investment plans, the operational tool of the PSDH. Specific Government programs for poverty reduction are implemented through various Ministries and follow these main lines of action: (i) social safety nets aimed at improving access to food for the most vulnerable: school canteens; community restaurants; cash and food transfers targeting vulnerable families; management of contingency food stocks in the event of disasters; (ii) agricultural investment programs aimed at increasing national food production: improved access to basic agricultural inputs and services through subsidies to smallholders; (iii) the establishment of a crop insurance system to protect farmers against natural disaster risks.

1.4 Process by which the strategy and investment plan were developed

The **2010-2025 agricultural development policy document** is the result of a participatory iterative process, based on the following principles : i) strong implication of the Ministry's senior staff and personnel; ii) participation of development partners (mainly FAO, IICA, World Bank, IDB, USAID, USDA) in the technical and financial discussions; iii) participatory consultations in Haiti with civil society groups, farmers' organizations, local authorities, private sector, and members of the international community. Workshops, meetings, consultations and information sharing sessions were organized to elaborate and validate the agricultural policy document.

The same approach was used to prepare the **2016-2021 National Agricultural Investment Plan**. Its content is the result of a process involving collaboration, information sharing and discussions with the main partner institutions, the Ministry of Agriculture's managers and technical personnel, both at the central and departmental level, as well as other stakeholders (technical and financial partners and farmers' organizations, among others).

1.5 Implementation arrangements and capacity to implement

1.5.1 Institutional arrangements for implementation and role of main actors

Coordination of the NAIP will be conducted at both the strategic and operational levels. At the strategic level, a Steering Committee presided by the Prime Minister will be created with a role of **strategic piloting**. The Ministry of Agriculture will be responsible for its technical secretariat. The Committee will be composed of all ministries involved in the execution of the NAIP, such as the Ministry of Economy and Finance, the Ministry of Planning, the Ministry of Public Works, the Ministry of Commerce and Industry, the Ministry of Public Health, the Ministry of Tourism, and the Ministry of Women's Affairs. The main technical and financial partners will also be represented. **Technical piloting** of the NAIP will be the responsibility of the Ministry of Agriculture's Strategic Orientation Council (COS).

At the operational level, coordination and monitoring of the NAIP is the responsibility of the Ministry of Agriculture's Programming Unit. This unit is best suited for this task due to its cross-sectional character, its assigned functions and its relationship with internal and external entities. Activities linked with operational functions will be carried out by the specific Technical Directorates identified when the different programs were designed. At the Departmental Directorate level, an **Advisory Monitoring Committee** will be established in all departments targeted for NAIP investments. This advisory committee will be composed of members of the Departmental Sectoral Table for Agriculture which includes representatives of the Ministry of Agriculture, of other sectoral ministries, NGOs, the private sector and farmers' organizations.

The human resources diagnostic recently carried out by the MARNDR with the support of partner institutions estimated the staffing requirements for the implementation of the actions envisaged, in particular those included in the NAIP. In total, a target of 1,885 managers and professionals for the whole country were identified. They should be assigned to management positions, administrative and management services, cross-functional positions and sector specialist positions.

In addition to the Ministry of Agriculture and other sectoral ministries, several other stakeholders will be involved in the implementation of the NAIP, including the following:

- **Private and non-profit sectors.** A public-private partnership will be established to improve linkages between production and markets and to promote information sharing. The private and non-profit sectors include: (i) **producers**, organized in cooperatives and non-profit associations. These organizations will be involved in planning, funding, execution and evaluation of program and project activities; (ii) **Non-Governmental Organizations (NGOs)**, which play a key role in rural areas (provision of basic and technical services, community organization, etc.); (iii) **engineering and consulting firms**, which are private operators providing services and expertise in various fields; and (iv) **financial institutions**, with which the Ministry of Agriculture will establish or strengthen partnerships to extend financial services to economic agents in the agricultural sector.
- **Local authorities.** They will, according to their prerogatives and within the limits defined by the law, contribute to better governance, support local development initiatives and participate in monitoring and evaluation of projects.
- **Development partners.** Development partners will continue to provide the technical and financial support that is essential for implementing programs and projects, in accordance with the orientations that are defined.

Monitoring of the NAIP will be carried out within a participatory framework involving all concerned stakeholders. The system will provide appropriate decision-making tools, and facilitate information sharing at the national and departmental levels.

1.5.2 Implementation performance of past program/projects

The 2010-2016 NAIP has facilitated funding for several projects that were implemented or are now ongoing in the country. These include the Food Security Project financed by the French Development Agency (AFD) from 2013 to 2016, the Strengthening of Public Agricultural Services project funded by the World Bank between 2011 and 2014, the second phase of the same project funded by the World Bank for the 2014-2020 period, the Artisanal Fisheries Program (2015- 2020) and the Watershed Management Project (2014-2019) funded by the IDB and the Small-Scale Irrigation 3 project funded by IFAD.

Through these projects, it was possible to allocate financial resources to specific sub-sectors to increase agricultural production. They focused on watershed management, irrigation infrastructure improvements, agricultural extension, support for agricultural services, access to inputs, fisheries development and aquaculture, training, etc. These projects have resulted in the diversification of food production as well as increased value-added and farm revenue.

Describing the implementation performance of each and every program would go beyond the scope of this document, but monitoring and evaluation reports are available for each of them.

1.5.3 Evidence of past implementation performance and the impact of activities from previous GAFSP projects in the country

The Ministry of Agriculture has implemented during the 2011-2016 period the first phase of the Technology Transfer to Small Farmers Project (PTTA) through funding provided by the GAFSP and the IDB. This project targeted the North and Northeast departments and provided incentives (direct subsidies) to farmers through a voucher program. This mechanism allowed them to access agricultural inputs and services provided by approved providers and develop agricultural practices that increased farm revenue and resilience to climate change.

The main results of the PTTA project are the following:

- 70,000 farmers registered in the National Farmer Registry for the North and Northeast departments and 35,000 in the Artibonite department;
- 500 local providers of agricultural inputs and services registered and serving farmers;
- 34,500 farmers (20,642 men and 13,792 women) benefited from incentives for production of rice, coffee, cocoa, vegetables and development of agroforestry systems in twenty communes of the North and Northeast;
- Total area covered: 15.525 hectares or an average of 0.45 ha. per farmer;
- 180 providers have been trained in quality standards for agricultural inputs;
- Construction of a seed quality control laboratory;
- Four beneficiaries of grants for Master's level studies in the seed sub-sector are studying in Europe;
- A seed sub-sector policy was developed.

The Ministry of Agriculture is also in charge of the execution of the Strengthening Public Agricultural Services Project (RESEPAG II), with funding from GAFSP and the World Bank. The RESEPAG II project objectives are (i) to strengthen the Ministry of Agriculture's capacity to provide and facilitate access to agricultural services; (ii) to improve market access and food security for small-scale producers in the targeted areas. The project is built around two main components: (1) General support services for agriculture (extension and training, market information, and animal and plant health services); and (2) Direct support for producers and associations.

For RESEPAG II, the main results achieved so far are the following:

For component 1:

- Preparation and publishing of the summary of the Master Plan for Agricultural Extension (PDVA);
- Rehabilitation of the Artibonite Valley Technical School for Agriculture;
- Rabies vaccination for 370,184 dogs;
- Support for vaccination of 612,000 heads of cattle against anthrax;
- Support for tagging 151,300 cattle in different departments of the country;
- Redeployment of 500 veterinary agents in 10 departments of the country;
- Gathering and dissemination of market data.

For component 2:

The newly created Agricultural Extension Fund offers co-financing for certain projects, through a process of identification and selection of Rural Producer Organizations (OPR). Their proposals are analyzed by the Agricultural Concertation Tables at the departmental level, with the support of a specialized service provider. Thirty sub-projects are being executed in the North and Northeast

departments and thirteen have been approved by the Concertation Tables. A total of 8,972 farmers have benefited from these projects (44% of them women and 56% men) amounting to a total¹ of approximately USD 3.6 million. The majority of these sub-projects (80%) include post-harvest and processing activities.

Part 2. Specific proposal for GAFSP financing

2.1 Specific objectives, expected results, and target beneficiaries

The **general objective** of the PTTA 2 is to increase agricultural productivity and food security for small farmers in selected areas of the North, Artibonite, South, and Grande Anse departments. The **specific objectives** are to: i) generate sustainable agricultural technologies, through the development of applied research and training programs, and ii) improve access to those technologies, through the implementation of a matching grant mechanism. The expected **beneficiaries** are: i) 55,000 farmers that will directly benefit from the matching grant mechanism promoting the adoption of technologies; ii) 3,000 direct and 15,000 indirect beneficiaries of the agricultural applied research and training programs. It is expected that women would represent at least 40% of these direct and indirect beneficiaries, as it happened in the first phase, PTTA 1.

The program is expected to generate the following **results**: i) generation and diffusion of at least 40 improved sustainable agricultural technologies through applied research and training, and through the matching grant mechanism; ii) at least 75% of the direct beneficiaries effectively adopt the improved technologies. The expected impacts are the following: i) increase the agricultural gross margin of beneficiaries by 30% and increase their food security by 30% (the Food Insecurity Experience Scale will be used).

The indicative **monitoring and evaluation framework** and **indicators** are presented in the following table. The results matrix will be fine-tuned during project design.

Impact	Increase agricultural productivity and food security for small farmers in selected areas of the North, Artibonite, South, and Grande Anse departments			
Indicators	Unit	Baseline	Target	Verification
Percentage difference in food security between beneficiaries who adopted the technology and control group	%	0	+30%	Baseline and follow-up surveys. FIES will be applied.
Percentage difference in agricultural gross margins between beneficiaries who adopted the technology and control group	%	0	+30%	Baseline and follow-up surveys
Component 1: Applied research and training				
Result	Improved availability of sustainable agricultural technologies			
New sustainable agricultural technologies developed and ready to be promoted	Technology	0	40	Project M&E reports
Beneficiary farmers that have adopted improved and sustainable technologies in the framework of applied research and training programs	Farmer	0	2,250	Baseline and follow-up surveys
Outputs	Agricultural applied research and training program implemented			
Agricultural applied research and training program implemented	Program	0	10	Project M&E reports
Number of farmers involved in applied research and training program	Farmer	0	3,000	Project M&E reports
Percentage of women among farmers involved in applied research and training program	%	0	40	Project M&E reports
Component 2: Promotion of sustainable agricultural technologies				
Result	Improved transfer of sustainable agricultural technologies			

¹ «Total » investment includes a 30% contribution from farmer organizations and 70% co-financing through RESEPAG.

Beneficiary farmers that have adopted improved and sustainable technologies in the framework of the matching grant mechanism	Farmer	0	41,250	Surveys
Outputs	Matching grant mechanism implemented			
Farmers receiving the matching grant mechanism	Farmer	0	55,000	Project M&E reports
Percentage of women among farmers receiving the matching grant mechanism	%	0	40	Project M&E reports

2.2 Justification for the overall approach

With a per capita annual GDP US\$ 818 (2015) and a 59% of the population living in poverty (World Bank, 2012), Haiti stands among the poorest countries in the world. The UNDP's Human Development Index's socio-economic indicators for 2013 placed Haiti 168th out of 187 countries. According to the World Bank Group, in rural areas, the poverty rate is even higher (75%) and more than 80% of Haitians who live in extreme poverty live in rural areas, where access to basic services remains very limited for a majority of the population and it is estimated that only 10% of the rural population has access to electricity and less than 8% to drinking water.

Food insecurity is widespread in Haiti: the country is ranked 77 out of 79 countries in the 2012 Global Hunger Index. Results of a recent WFP analysis (2015) indicate that approximately 47% of the households are moderately or severely food insecure. About 3.6 million persons (700,000 households) are food insecure and approximately 1.5 million persons (300,000 households) are severely food insecure. Households with children of less than five years of age are much more exposed to frequent food shortages². As a consequence, one fifth of children less than five years old are chronically malnourished (DHS, 2012)³. The Matthew Hurricane, which hit Haiti in October 2016, generated an emergency situation especially in the South, Grand Anse, and Nippes departments, where 1.4 million persons need food assistance (CNSA, 2016).

The agricultural sector remains strategic for the Haitian economy. Agriculture plays a major role in the Haitian economy by contributing 25% of GDP and 71% of employment in rural areas. The gap between local production and the demands of an increasing population has progressively widened over the years. Today, the country only satisfies 45% of its food needs and is dependent on imports of food products such as wheat, rice, sugar, oil and poultry. The deficit is essentially covered by massive imports of food products, particularly rice.

Haitian agriculture suffers from a very low level of productivity, even when compared to other countries in the region (as shown in Table 1, for the main crops grown in Haiti).

Table 1. Yields for main Haitian crops compared to yields of other countries in the region⁴

Product	Leader	Haiti's yield as % of leader's
Banana	Nicaragua	11%
Cassava	Jamaica	14%
Coffee Green	Honduras	24%
Maize	Nicaragua	52%

Labor and land productivity have even been declining in the last two decades⁵, with total factor productivity declining at an annual average -0.5% in the period 2001-2012 (compared with a 1.7% simple average growth for the Latin America and Caribbean region)⁶.

² World Bank and ONPES, 2014.

³ Haiti Demographic and Health Surveys.

⁴ Countries considered for this comparison are: Dominican Republic, Guyana, Honduras, Jamaica, and Nicaragua.

⁵ Cirad, 2015.

Some of the many factors contributing to exacerbate this low productivity are:

(i) The low level of farmers' investment, which is explained not only by the significant financial constraints faced by farmers, due notably to the lack of agricultural credit, but also by a strong asymmetry of information about existing technologies, farming techniques, access to markets and climate risks;

(ii) The lack of financial and human resources to develop agricultural innovation. Agricultural research has been virtually non-existent in Haiti for nearly three decades⁷, as stated during the series of conferences⁸ on the modernization of the agricultural research system supported by the IDB since 2012. Aggregate numbers show that over the last three decades technical efficiency in the Haitian agricultural sector has fallen drastically, at a -1.8% average yearly rate (Nin-Pratt, A. et al. 2015). This is a reflection of an outdated institutional framework for the research, technology transfer and extension systems. The lack of local expertise in applied and adaptive agricultural research and technology transfer is in turn partially explained by the lack of training and educational opportunities in these areas.

Given the circumstances described above, the majority of producers in Haiti are still using basic techniques. The sector is characterized by the use of uncertified, low quality seeds, the lack of appropriate soil conservation, a very limited and often inappropriate use of pesticides and fertilizers, the use of rudimentary tools and equipment, an underdeveloped market for agricultural goods and services, and an extremely weak agricultural extension services and technical assistance. The 2009 General Agricultural Census (RGA) shows that only 2.6% of farmers received some type of technical assistance, 7% used mechanical equipment and 43% identified weak agricultural research and extension as a constraint for the development of the sector. A constrained access to factors of production (capital, land, labor, water⁹), the risks (market, climate) that farmers are facing, and the replacement of perennial crops by annual crops (which are more profitable in the short term) also limit the long-term growth of the productivity of the agricultural sector in Haiti.

The consequences of low agricultural productivity in Haiti are numerous. First of all, per capita income in the Haitian agricultural sector has stagnated in recent years. Given that GDP per hectare per year is approaching US\$ 800 at present and farmers work on average on 0.5 hectares per person, the annual agricultural GDP per capita is currently estimated at US \$ 400 per year¹⁰. As a result, in 2010 for example, about 88% of individuals in rural areas were living below the poverty line and 59% of them earned less than US\$ 1 a day.

In addition, the vulnerability of farmers to various risks such as natural disasters, exacerbated by climate change, erosion, drought and pests remain substantial, threatening at the same time any productivity improvement. The latest **category 5 hurricane Matthew** severely hit the southern peninsula of Haiti (particularly the South and Grande Anse departments) and caused **economic damages and losses** of US\$ 1.9 billion, of which **US\$ 583 million were in the agricultural sector**.

The damages and losses in perennial crops (coffee, cocoa, breadfruit, coconut, avocado, citrus and other fruit) and timber, which are extremely important for food security and rural income were particularly high and represented **US\$ 433 million** (74% of agricultural damages and losses). The pressure on the natural resources of the country is also increasing and is illustrated in particular by the high levels of deforestation and erosion: most studies estimate indeed that no more than 5% of Haitian surface is currently covered by primary forests¹¹.

From an economic perspective, several reasons justify public investment in agricultural research and training, as well as technology transfer services to farmers. In fact, the literature recognizes the existence of several market failures that hinder the process of agricultural technology adoption in

⁶ Nin-Pratt, A. et al., 2015.

⁷ Cirad, 2015.

⁸ Assises de la recherche agricole en Haiti, 2013.

⁹ Only 13% of agricultural land has access to water, according to the 2009 General Agricultural Census.

¹⁰ Cirad, 2015.

¹¹ Cirad, 2015.

developing countries, including: (i) lack of access to information and/or asymmetric information; (ii) input and output market inefficiencies (Feder, Just and Zilberman, 1985; Jack, 2013); (iii) liquidity constraints and access to credit; and (iv) risk aversion.

Lack of information limits technology adoption not only because agricultural producers lack knowledge on the effective use of these technologies, but also because they lack information regarding location of private providers or additional costs of production. For instance, in the case of Nepal, Joshi and Pandey (2005) show that farmers' perceptions regarding different rice varieties influence adoption decisions. Therefore, the authors conclude that it is important to disseminate information broadly using different methods to form accurate perceptions of the technologies to be promoted among farmers. Similarly, Conley and Udry (2004) demonstrate the importance of learning and information effects on the technological adoption in Ghana. Specifically, the authors show that pineapple producers change their input use patterns only when they gain access to information regarding production yields from neighboring farmers. Finally, Bentley et. al (2011) measure the effect of farmers field schools where free information regarding plant health and agricultural practices is provided to farmers. The authors find that adoption rates are high (about 82%) for producers who received the information in Bolivia.

As for the presence of thin markets for technology providers in rural regions, this is mainly caused by the small population density spread in remote and large areas without accessible roads and high transaction costs (IFAD, 2003). Therefore, it is not profitable for technology providers to be located in areas under these conditions without certainty about potential demand. On the other hand, it is difficult for farmers to reach technology providers as these are primarily located in urban or suburban areas.

The presence of liquidity constraints and credit restrictions is one of the principal factors that limit smallholder farmers' technology adoption, particularly in rural areas, where financial markets are thin or non-existent, as in the case of Haiti.

Finally, the fourth market failure is risk aversion. This factor limits technology adoption because producers prefer to have certainty regarding the future yields that will be obtained with new technologies before incurring the initial cost. Thus, producers tend to postpone technology investments until they can confirm the benefits associated with the adoption of such technologies through experience from other farmers (Feder, 1980). Several studies provide evidence on the negative impact of risk aversion on technology adoption such as Abadi Ghadim, Pannell y Burton (2005) and Besley and Case (1994).

The PTTA II aims to improve technology adoption by reducing the aforementioned market failures. Specifically, the provision of a matching grant that partially covers the cost of an agricultural technology aims to ease liquidity and credit constraints. Secondly, the provision of technical assistance to farmers aims to reduce the barriers related to risk aversion. Lastly, the implementation of technology fairs aims to reduce information asymmetries and eliminate problems related to shortage of supply and thin markets by providing a physical space to link demand (small farmers) and supply (technology private providers).

The main objectives of the program are to increase income and food security for beneficiary households through improvements in agricultural productivity. The channel through which increases in agricultural productivity are expected to increase food security is twofold. First, higher agricultural productivity translates into higher agricultural yields increasing food production for home-consumption. Second, higher agricultural productivity will increase agricultural income from production sales which will improve household's purchasing power and, therefore, food consumption.

There is evidence in the literature that provides rigorous evidence on the impact of similar programs in Latin America and the Caribbean. Gonzalez et. al. (2009) evaluate the impact of an agricultural technology transfer program, "Technological Support in the Agricultural Sector", that aims to reduce the barriers that limit technology adoption among farmers in the Dominican Republic. The study

presents evidence that the adoption of the promoted technologies increases productivity levels for beneficiary producers of rice and livestock. Cerdán-Infantes et al. (2008) analyze the impact of the PROSAP program in Argentina. This program provides extension services to grape producers. The authors find that the program increased the adoption of high quality varieties of grape. Also, Maffioli et. al (2013) evaluate the impact of the PREDEG in Uruguay. The program provides co-financing to encourage technology adoption and boost agricultural production by smallholder and medium-size farmers. The authors find that the program increased the density of fruit planting and the adoption of improved varieties but do not find evidence of effects on productivity, which is attributed to the short period of study.

Finally, in regards to food security, Salazar et. al (2016) assess the impact of the CRIAR program in Bolivia that aims to improve access to agricultural technologies through a voucher scheme. The results show that beneficiary households are 20–30% more likely to be food secure than the control group and 22% less likely to be concerned about lack of food. This increase was driven both by food availability – the annual value of production per hectare increased by 92% and the value of production sold by 360% – and food access – the results show that participation in CRIAR increased net annual agricultural household income by 36% and per capita household income by 19%. Also, an ongoing study of the Agricultural Program for Technological Innovation II (PATCA II), that provides vouchers to improve agricultural technology adoption, shows that beneficiary farmers increased food security by 27% (Aramburu et. al., 2016).

From an operational standpoint, the proposed program has been designed on the basis of the lessons learned through several programs which implemented similar incentive mechanism in Haiti: i) the Agricultural Services Strengthening Program 1 and 2 (RESEPA), financed by the World Bank and GAFSP; ii) the Agricultural Technology Transfer to Small Farmers (PTTA), financed by IDB and GASFP; iii) the Natural Disaster Mitigation Program (PMDN), financed by IDB; and iv) the Food Security Support Program (SECAL), financed by the European Union and the French Development Agency. An analysis of the performance of the incentive mechanism of these programs was carried out in 2015 and provided several lessons learned, discussed below. The program is also based on lessons learned through five similar projects financed by IDB in¹² Latin America and the Caribbean, whose evaluations, based on experimental or quasi-experimental methods, assessed positive results in terms of the improvement of agricultural income and food security.

The main lessons learned that have been included in the design of this program are the following:

- (i) The design of new technological packages must be directly related to the results of applied agricultural research, considering the diversity of climates and social contexts in which they will be implemented;
- (ii) Prospective beneficiaries should be involved in the choice of the technology menus and provide counterpart financing in cash, in order to assess their interest for these technologies;
- (iii) It is necessary to provide technical assistance to cover at least one agricultural cycle in order to provide information about the proper use and implementation of the new technologies as well as to accompany farmers during the production process;
- (iv) The menu of technologies should be designed as to enhance agricultural productivity while contributing to climate change adaptation and without damaging the environment. Also, the promotion of technologies and practices should be avoided if certain conditions related to access to factors of production (especially water) are not met;
- (v) The technological packages for agroforestry should be encouraged, as they offer an opportunity to combine perennial crops such as coffee, cocoa, breadfruit, fruit and timber trees with shorter cycle crops such as banana, yam or malanga. These systems contribute

¹² 1397/OC-DR and 2443/OC-DR in the Dominican Republic; 2055/BL-NI in Nicaragua; 1800/OC-PR in Paraguay; and 2223/BL-BO in Bolivia.

to sustainably reforest some mountainous areas of the country, reduce erosion, and have strong positive externalities on the environment, while allowing farmers to obtain short and long term benefits from these plots;

- (vi) The definition and control of quality standards for agricultural inputs, as defined by the MARNDR, is crucial during implementation. The program will regularly disseminate the quality standards manual and organize training for providers, particularly on the basis of the results of the applied research component.
- (vii) It is necessary to develop synergies and complementarities among projects at local level (i.e. agricultural credit programs, watershed protection through the combination of infrastructure, adoption of sustainable cropping practices and land tenure security; value chain development through support to agribusiness and SMEs and adoption of sustainable cropping practices) in order to maximize impacts and ensure sustainability.

Consistency with current Government strategy for the sector. The objectives, results and activities of the PTTA II are in line with the Agriculture Policy Document for 2010-2025 and NAIP 2016-2021. In these documents, the Haitian Government, as well as the private sector, donors, and civil society have agreed on the importance of providing increasing medium and long term support to the agriculture sector of Haiti to address the structural problems and weaknesses surrounding public institutions supporting its development. This vision aims to build-up and strengthen an agricultural sector that is modern, founded on the efficiency and effectiveness of family agriculture and agribusinesses, competitive in local and international markets, able to ensure food security for the population, environmentally sustainable and able of producing surpluses for value added processing. Agricultural research and extension services have been identified as key sub-sectors to be supported to promote the adoption of sustainable agricultural technologies, which would contribute to improve agricultural income and climate change resilience of smallholders' farmers.

Policy impact. The program builds on on-going policy reform processes and is expected to consolidate them, especially in the agricultural research, extension services, and technology transfer focus areas. The PTTA 1 program actively contributed to review the legal and regulatory framework to promote the development of seeds and fertilizer markets, and improve public policies related to agricultural inputs subsidies, particularly by: i) updating the seed regulatory framework with the support of FAO, ii) carrying out an assessment of the current policies related to seeds and fertilizer markets and, iii) implementing for the first time in Haiti a *smart-subsidies* mechanism for the adoption of technologies. To support agricultural production and face recurrent emergencies, the MARNDR usually implements measures such as subsidies to fertilizer and seed prices or direct distribution of agricultural input and equipment. The way these measures are carried out generally generate low impacts, and adverse effects such as the withdrawal of the private sector from input production and distribution, or inequitable access to input due to non-transparent distribution processes and rent-seeking behaviors. The new incentive mechanism improved the efficiency and effectiveness of such measures since it was market friendly, more transparent and equitable. The mechanism incentivized private investments in agricultural input supply chains, and let the farmers choose the technologies that were more suitable to their farming system. The PTTA 1 also fostered the creation of the National Farmer Registry, which is now being handled by the MARNDR, independently from the Project. The PTTA 2 is based on the lessons learned through PTTA 1 and other similar programs, and will continue to build on these processes in order to support the shift of the MARNDR towards more efficient and effective policy measures. On the other hand, since 2012, IDB has been supporting the Government of Haiti in the modernization of the agricultural research system through technical assistance and policy dialogue including all relevant stakeholders. Several institutional measures have been taken, and PTTA 2 is expected to support the implementation of the reform process, by providing financing and supporting the new institutional settings.

Consistency and links with GAFSP framework document. The program is perfectly consistent with the GAFSP framework document, since it aims to improve income and food security of small farmers in Haiti, through more and better public and private sector investment in the agriculture and rural

sectors. The program is aligned with national priorities and benefits from a strong ownership by the Government, thanks to the previous implementation of PTTA 1 and other similar programs. The Government also fostered the alignment of several donors around the program's investment axes, particularly the IDB, World Bank, USAID and the French Development Agency. The program is aligned with the components 1, 2, 3 and 5 of the GAFSP framework document on the following areas: i) adoption of higher yielding technologies; ii) technology generation; iii) water management; iv) improvement of skills and access through grower schemes and contract farming; v) post-harvest management; vi) resilience and adaptation to climate change; vii) capacity-building for sector strategy; investments and implementation; and viii) enhancing design, monitoring and evaluation.

Consistency with IDB's policies and strategic frameworks. The program is fully aligned with the IDB Country Strategy approved in July 2010 (GN-2465-2), in which agriculture is one of the pillars identified for economic growth. The proposed program will contribute to the following IDB lending program priority targets established in the Report on the Ninth General Increase of Resources of the Bank (IDB-9): (i) poverty reduction and social equity, as the program supports small farmers' production levels; and (ii) climate change initiatives and environmental sustainability, as the program will promote the adoption of agricultural technologies and practices aiming at reducing land degradation, encourage a resilient agriculture and allowing farmers' adaptation to future changes in weather and precipitation patterns. The program will also contribute to the annual growth rate of Latin America and the Caribbean's agricultural GDP, a regional development goal of the IDB.

2.3 Activities to be financed and their justification

The program will be structured in the following two components:

Component 1: Agricultural applied research and training. This component will finance the following activities: i) applied and adaptive agricultural research projects developed and implemented by national and/or international institutions, in order to create, improve and/or adapt innovative, profitable, and sustainable agricultural technologies that will enhance the supply of technological options available to farmers; and ii) the strengthening of the higher education curriculum to improve applied and adaptive research and technology transfer capabilities. In this context, specific attention will be given to the Faculty of Agronomics and Veterinary Medicine (FAMV), which is being rebuilt with IDB financing after its destruction by the 2010 earthquake. The results of Component 1 will progressively provide inputs for the technology menu promoted by Component 2.

Component 2: Promotion of sustainable agricultural technologies. This component will finance the adoption of innovative, profitable and sustainable agricultural technologies that will improve long term farm profitability and generate positive environmental externalities. The component will be implemented through the agricultural incentives program conducted by the MARNDR and will use a matching grant scheme. This scheme will follow these guiding principles:

- (i) Promote improved technologies, adapted to the different agro-ecological environments, local context and climate change perspectives, and focused on long-term investments;
- (ii) Favor market-based solutions that do not undermine incentives for private investment;
- (iii) Recognize that effective demand from farmers is critical for long-run sustainability, particularly through the request of a financial contribution from beneficiaries;
- (iv) Stress economic and environmental viability as the basis for technology promotion;
- (v) Empower farmers to decide on productivity enhancement and farm management practices;
- (vi) Promote technologies whose adoption by beneficiaries is easy to check;
- (vii) Ensure an official quality certification of goods and services for each technology;
- (viii) Implement a monitoring and evaluation system that rigorously measure impacts and results, and strictly control the fiduciary aspects of the co-financing mechanism.

On a preliminary perspective, the **technology menu** may include: small irrigation equipment, animal-drawn plowing equipment, harvest and post-harvest equipment as well as sustainable agricultural

practices such as agro-forestry systems and sustainable soil and water management techniques. The financing of technology may include equipment, seedlings, labor and technical assistance.

Part of the **technical assistance** to farmers will be provided by the agricultural technology suppliers, according to their capacities (i.e. a supplier of irrigation equipment can train farmers on installation and maintenance, a coffee cooperative can provide coffee seedlings together with technical advice on coffee cropping practices, etc.). In case of weak capacity of the suppliers, the program will provide technical training to the suppliers. The program will also hire technical service providers to assist with the management of the matching grant mechanism and that will provide part of the technical assistance, when necessary.

Eligible farmers for the matching grant mechanism will meet the following criteria: (i) cultivate at least a plot of 0.25 ha of land in the selected areas; (ii) the plot of land where they plan to implement the improved technology is not in a situation of conflicting use; (iii) are not receiving similar supports from another government or donor financed program, or have not benefited from incentives from PTTA 1, PMDN or RESEPAG 2; (iv) are willing to provide a counterpart in cash to acquire the technology. Other specific eligibility criteria will be applied according to each technology. For instance, the necessity to have access to surface or underground water in the case of small irrigation equipment.

Technology suppliers to be involved in the provision of agricultural goods and services will be identified through a competitive selection process, which will ensure their technical and financial capacities to provide the selected technologies in the selected areas. The suppliers will be diverse (small, medium and large private companies, producers' organizations, cooperatives, foundations and others) and will be linked to the applied research and training activities in order to ensure an adequate transfer of technologies from the research activities to the stakeholders of the agricultural input and technology supply chains. The suppliers will have to demonstrate their compliance with national legal and fiscal requirements. Price and quality standards of agricultural inputs and services to be promoted will be defined by the MARNDR together with the suppliers, and revised periodically.

The **procedures** to manage the incentives have been updated and a new operation manual¹³ has been elaborated and agreed between the MARNDR and donors that are financing similar mechanisms. The program will finance an average of 80% of the cost of the technology, and the farmer the remaining 20%¹⁴, in cash. The amounts will be reviewed annually by the Bank and the executing agency. Component 2 will engage technical service providers to support the dissemination, matching grant management, provision of part of the technical assistance, technology verification and monitoring and evaluation. The MARNDR will mobilize a technical team in the selected areas to supervise program activities, and ensure the control of price and quality of agricultural inputs and services. All financial resources (beneficiary cash counterpart, payments to suppliers) will be managed by a financial intermediary (commercial bank or micro-finance institution) accredited by the Central Bank of Haiti. A hundred percent of the incentive granted to beneficiaries will be assisted, follow-up and verified. The MARNDR will be responsible for contracting an external auditor eligible to the Bank to perform the technical and fiduciary audit.

Component 1 will stimulate the development of agricultural scientific knowledge, which is identified by economic theory as an exemplary public good (it is non-rival and non-excludable). Component 2 will mitigate the lack of access to credit and liquidity constraints faced by smallholders in Haiti, and stimulate the market for agricultural inputs. This component will also generate positive environmental externalities, since it will promote sustainable agricultural practices, particularly agroforestry systems. Through these two components, the proposed operation will counter existing market failures and public intervention is therefore justified.

¹³ Annex 2.

¹⁴ Specific amounts will be defined for each technology provided through a specific study.

In this framework, the theory of change is based on the following causal link: i) relaunching the financing of applied research and training programs will allow generating improved sustainable agricultural technologies; ii) the provision of partial financing to small farmers through a matching grant mechanism will mitigate the lack of access to credit and reduce liquidity constraints that prevent them from acquiring the improved agricultural technologies, iii) the application of agricultural technologies will improve land and labor productivity at farm level, which in turn will improve agricultural income and reduce food insecurity.

The program will mainly have positive environmental and social impacts. The project encourages the adoption of technologies selected in part because of their positive or neutral environmental impacts, as well as for being suited to the agro-ecological and climate conditions, culture, and gender of the beneficiaries. Also, the project will have a significant positive social impact by helping eligible small-scale producers who live in poverty and are vulnerable to food insecurity.

Experience of PTTA and PMDN. With financial support from IDB and GASFP between 2012 and 2016, the MARNDR implemented an incentive mechanism to promote the adoption of agricultural technologies through the PMDN and PTTA 1 programs. These programs covered a total area of 20,240 hectares across the South, North and North-east departments. They benefitted a total of 43,956 small agricultural producers: 9,043 for PMDN and 34,913 for PTTA 1. While PMDN focused on the promotion of agroforestry technological packages, PTTA 1 promoted technological packages for irrigation, sisal, annual crops (rice, sweet potato, peanuts and vegetables), and agroforestry (coffee, cocoa, diversified crop systems) to 12, 100, 9,083 and 25,718 small agricultural producers respectively. Qualitative and quantitative evaluations assessed that with an average adoption rate of 80%, and with average values of US\$ 595/farmer for PMDN and US\$ 700/farmer for PTTA 1, agroforestry technological packages have generated very positive results, since they contributed to the reforestation of around 13,082 hectares in the country, and led to significant increases in gross value added per plot ranging from 10% to 109%. The evaluations also observed that results have been more limited for the annual crops (rice and vegetables), with no significant improvement of gross value added, since farmers did not modify their practices. However, the subsidies contributed to reduce farmer decapitalization, as farmers used the vouchers to avoid selling cattle or contract informal usurious credit to buy agricultural inputs. Other positive results of PMDN and PTTA 1 are the registration of around 120,000 farmers on the National Farmer Registry (12% of the total number of farmers in the country), and the registration of around 600 agricultural technology suppliers, 180 of which have been trained on technology improvement (production of healthy coffee seedlings, cocoa pruning, etc.).

Gender. In the framework of PTTA 1, it has been observed that 40% of the beneficiaries were women and a major part of them were chief of household. A study on the mainstreaming of gender was conducted by the MARNDR¹⁵, and the findings and recommendations will be applied in the present program, through a specific gender strategy. The main axis of the strategy will be: i) implement a communication and inclusion strategy in order to ensure that women are aware and prepared to participate in the program; ii) develop and promote agricultural technologies adapted to women specific activities, in the framework of both components, iii) monitor and evaluate program impacts and results in a sex-disaggregate way.

Environment. The Program will mostly promote the use of environmentally friendly agricultural technologies, such as agroforestry technological practices, which contribute to prevent soil erosion, retain water and improve soil fertility. However, the Environmental and Social Assessment of the program identified some potential impacts such as: (i) mismanagement of pesticides and other chemical inputs used to treat some inputs included in some other technological packages; (ii) introduction of new varieties of existing species or new species without the required control measures; (iii) pollution generated by small-scale agro-industrial processing (such as coffee wash, cocoa

¹⁵ Annex 3.

fermentation); (iv) over-exploitation of water resource through the promotion of irrigation small-scale technologies; and (v) occupational health and safety risks. Adequate mitigation measures will be designed and implemented, such as: (i) update of the Pest and Pesticides Management Plan elaborated in the framework of PTTA 1; (ii) the update the Environmental and Social Management Plan of PTTA 1; and (iii) the application of procedures to avoid excessive density of irrigation technologies.

Links with other projects and government programs/activities. The targeted beneficiaries will be smallholder farmers living in selected areas of the North, Artibonite, South, and Grande Anse Departments, in order to maximize synergies with other IDB-funded programs in Haiti, particularly those related to land tenure administration (grant agreement 2720/GR-HA) and watershed management and natural protected areas (3622/GR-HA, GRT/FM-11803-HA). The program will be developed along other MARNDR initiatives which provide agricultural incentives for technological innovation through the same mechanism (such as the WB/GAFSP-funded program RESEPAG II, which is being implemented by the same Project Executing Unit, using the same operational manual). The program will also develop synergies with other initiatives related to agricultural research and extension in the country financed by other donors (USAID, European Union, Swiss Cooperation, French Development Agency, among others).

2.4. Implementation arrangements

The executing agency will be the MARNDR, through the “PTTA/RESEPAG” Program Executing Unit (PEU) which has been executing the PTTA 1, RESEPAG 1 and 2 and SECAL programs since 2011. The PEU will be responsible for the overall administration, supervision and general evaluation of the program. The Directorate of Innovation will be charge of supervising the Component 1. The Ministry Procurement Unit (UPMP) will be in charge of the procurement of works, goods and services.

The PEU is composed by a full technical and administrative team which already demonstrated its capacities to implement similar programs. The PEU will also involve the decentralized MARNDR’s services at departmental and municipal level in the overall program implementation and supervision.

A steering committee will be set up, composed by representatives of the MARNDR, the Ministry of Economy and Finance, representatives of farmer organizations and private sector. The steering committee will provide strategic guidance and approve the annual working plan.

Component 1 is expected to strengthen the capacities of the Directorate of Innovation in re-launching the financing of agricultural applied research and training. This component will also contribute to strengthen the procedures and capacities of the entities involved in the modernization of the agricultural research system supported by IDB since 2012.

The program will also strengthen the capacities of farmers’ organizations and agricultural technologies suppliers in the provision of improved goods and services, particularly through the transfer of the results of the research activities.

2.5 Amount of financing requested and timeframe for implementation.

The program budget is presented in the following table.

Estimated budget (million US\$)					
Categories of expenditures	Qty	Unit cost	TOTAL	GAFSP	BID
Component 1. Agricultural applied research and training			10		10
<i>Agricultural applied research and training programs</i>	10	0.9	9		9
<i>Complementary activities (workshops, scholarships, etc.)</i>			1		1
Component 2. Promotion of sustainable agricultural technologies			58	20	38
<i>Matching grants</i>	55000	0.001	55	20	35
<i>Matching grants administration cost</i>			3		3
<i>Complementary activities (workshops, etc.)</i>			1		1
Administration and audit			5		5
Monitoring and Evaluation			1		1
Contingencies			1		1
TOTAL			75	20	55

No GAFSP resources are required for program design, as IDB is financing its preparation (design of the components, gender strategy, ex-ante economic analysis, update of the operational manual, and environmental and social analysis). The program is expected to be executed over five years, from July 2017 to June 2022.

Additionality of GAFSP funding. Out of the USD 796 million budget foreseen in the 2016-2021 NAIP, USD 426 million is not yet covered. About USD 146 million are missing for the reforestation of watershed, support to agricultural production, support to post-harvest and commercialization, and research and extension. GAFSP resources will contribute to fill this financing gap for those items, by funding matching grants for about 20,000 farmers. GAFSP resources will only finance investments in matching grants, as all other activities and administration costs of the program will be covered by the IDB.

This GAFSP funding will be additional to the US\$ 35 million resources already provided by GAFSP in June 2010 to Haiti through the supervising entities WB (US\$ 10 million) and IDB (US\$ 25 million), which aimed to increase access to improved private agricultural services and inputs for crop production and strengthen the agriculture sector's research, extension, and training capacity. The new GAFSP financing will cover additional farmers which have not benefited from these operations, in additional areas, particularly the South and Grande Anse departments, which have been severely affected by the hurricane Matthew. This new GASFP funding will not displace other donor or potential private sector financing. A list of recent major donor funded agricultural projects with their respective amounts and implementation status is presented in Annex 1.

2.6 Preferred supervising entity

The expected supervising entity is the Inter-American Development Bank (IDB), which has been supervising the PTTA 1 program, with highly satisfactory performance. The Government, through the PTTA 1 program, financed the evaluation of the 2010-2015 NAIP and the elaboration of the 2016-2021 NAIP.

2.7 Post project sustainability and exit strategies

Main assets (technologies) will be provided to individual farmers and will be maintained by them for the rest of their expected life. In order to optimize the targeting of beneficiaries that need the technologies and are able to maintain them, the project will apply a matching grant scheme, whose co-payment structure will be defined through a rigorous and innovative behavioral approach that will unveil the real willingness to pay of the farmers for the various technologies included in the menu. In addition, a credit facilitation strategy will be developed as part of project implementation, involving and generating capacities for local authorities and the same financial institutions that will be collecting the co-payments for the project. This strategy will define, taking into account the same gender and inclusion provisions included in the project, schemes for future access to credit for at least the most performing beneficiaries that the project will reach. The combination of the mentioned measures, in coordination with the policy priority defined by the GOH, constitutes the long term exit strategy for this type of interventions.

The **exit strategy** of the matching grant mechanism is therefore based on the following principles: i) the adoption of improved technology will improve farmers' income, and they will in turn invest in the same technology with part of the added value generated, ii) the financial contribution by the farmers will ensure the willingness to pay for the technologies and the commitment to maintain it, iii) most technologies are a one-shot investment (perennial crops, equipment) and do not need recurrent financing, iv) the program will establish synergies with other programs financed by IDB and other donors related to agricultural credit and private sector development. The program will also implement a pilot initiative to link credit and matching grant.

2.8 Risks and risk management

A risk identification and management workshop was conducted in November 2016, to identify program risks and mitigation measures. All main counterparts (IDB, MARNDR, private sector, development partners) have been consulted for the definition of the risk matrix, whose summary is presented below.

RISKS	TYPE OF RISK	MITIGATION MEASURES
1. Market prices distortion	Economic	<ul style="list-style-type: none"> - Cost and quality monitoring; - Professional roundtable for monitoring and price transparency; <ul style="list-style-type: none"> - Clear contract between Ministry and providers; - Possibility to exclude providers who do not follow the rules.
2. Insufficient number of good quality technologies and inputs suppliers	Economic	<ul style="list-style-type: none"> - Strengthened selection process of potential providers, including quality and quantity control; <ul style="list-style-type: none"> - Trainings; - Updated quality standards for technologies; - Possibility to exclude providers who do not follow the rules; - Technology transfer to providers through the Research Component.
3. Cash constraint of suppliers	Economic	<ul style="list-style-type: none"> - Strengthened selection process of potential providers, including quality and quantity control; - Promotion of link with microfinance institutions, including programs financed by IDB and Ministry of Commerce; - Good planning of the campaigns in terms of areas and quantities of matching grants.
4. Extreme climatic events (drought, floods, hurricanes, among others)	Environmental	<ul style="list-style-type: none"> - Promotion of technologies that are resilient to climate change; <ul style="list-style-type: none"> - Research on climate resilience; - Good planning of the campaigns in terms of areas and seasons.
5. Complexity of grant management process	Operational	<ul style="list-style-type: none"> - Updated operational procedures, based on first phase experience; <ul style="list-style-type: none"> - Improvement of information system.
6. Political instability and related changes of policy priorities of the Ministry	Political	<ul style="list-style-type: none"> - Maximum level of delegation of authority to the Project Coordinator;
7. Demand for vouchers largely exceeds resources	Economic	<ul style="list-style-type: none"> - Transparency and communication reinforced at the local level and targeted to specific areas; - Possibility to maintain application for several campaigns if not selected previously.
8. Existing Ministry supply-driven subsidy programs interfere with the supply of technologies and create double benefits for provider	Institutional	<ul style="list-style-type: none"> - Focus on the technologies that do not receive other sources of subsidy.
9. Technological packages are not constantly updated and improved in order to better fit with demand	Technical	<ul style="list-style-type: none"> - Lists of technologies updated once a year, based on demand, research results, and a monitoring of the research activities conducted in the country.
10. Value added by the technological packages absorbed by household consumption expenses	Economic	<ul style="list-style-type: none"> - Promote synergies with microfinance initiatives; - Introduction of the matching grant mechanism.
11. The selected technologies are not suitable for women	Social Inclusion and Gender	<ul style="list-style-type: none"> - Studies to identify gender-smart technologies; <ul style="list-style-type: none"> - Tailored communication campaigns; - Specific monitoring on gender.
12. Mismanagement of pesticides promoted by the program	Environmental	<ul style="list-style-type: none"> - Strengthened training sessions on pesticide management and integrated pest control; <ul style="list-style-type: none"> - Updated Pesticide Management Plan; - Inspection missions of the Directorate for Vegetal Protection from MARNDR on waste management.
13. Excessive use of water resources through new technologies financed	Environmental	<ul style="list-style-type: none"> - Adequate targeting of areas, based on water availability assessment; <ul style="list-style-type: none"> - Balanced promotion of water consuming technologies.

2.9 Consultation with local stakeholders and development partners

Extensive consultations were held during the past few months in order to design PTTA II and the related GAFSP financing. The main counterparts that have participated to the consultations include the MARNDR, local agricultural authorities (DDAs, BACs), organizations that have participated in the execution of PTTA (AAI, CA17, AVSI), development partners that execute similar interventions in other areas (World Bank, USAID, AFD), local NGOs. Focus groups with beneficiaries were also conducted, particularly in the context of an evaluation of the voucher system led by IRAM. The consultation process has been extensive and has benefited from a continuous exchange of information and experiences among the different partners, leading to the improvement of the design of the second phase and the inclusion of the lessons learned by the various actors during the recent years. Particular attention and the organization of specific focus groups has been devoted to the gender aspect of the intervention. Specific studies have been conducted in order to tailor even better the proposed menu of technologies to female farmers and female head of households.

3.0 Plan for detailed preparation

Key government team members who will finalize program preparation with the supervising entity:

1. Hermann Agustin – General Coordinator of the PTTA at the MARNDR;
2. Jean Robert Chery – Technical Coordinator of the PTTA at the MARNDR;
3. Garry Augustin – Director of Innovation at the MARNDR;
4. Collins Zamor – Monitoring and Evaluation Specialist for PTTA at the MARNDR.

Expected project preparation timing:

- Presentation of the Proposal: January 2017;
- Decision from GAFSP: March 2017;
- Negotiations between IDB and GOH: April 2017;
- Approval by the Haitian Minister of Agriculture: May 2017;
- IDB Board Approval: May 2017;
- Execution Start Date: July 2017.

The funding for project preparation is provided by the IDB. No additional funding is needed.

Annex 1: Main agricultural projects financed by donors in recent years

Project	Source of funding	Amount in USD	Main activities	Period of execution	State of progress
PTTA	IDB/GAFSP	40 million	Financial support to individual farmers using vouchers for improvement of staple crop and export production Strengthening of the national seed service	2012-2016	90%
PMDN 2	IDB	47 million	Strengthening of capacity for climatic risk reduction Reduction of climatic risk	2016-2021	5%
PROGEB A	IDB	25 million	Construction of infrastructure for runoff management Institutional strengthening	2014-2019	20%
RESEPA G 2	World Bank/GAFSP	48 million	Training of agricultural technicians Plant and animal health services Financial support to individual farmers through a	2012-2018	45%

			<p>voucher program</p> <p>Funding of sub-projects proposed by farmer organizations</p>		
SECAL	AFD/European Union	18 million	<p>Rehabilitation of the Avezac irrigation system</p> <p>Strengthening of 10 water users' associations</p> <p>Support for the corn, egg and poultry value chains</p> <p>Support for the banana value chain in the Arcahaie plain</p>	2013-2017	75%
Cereal value chain development	Taiwan	10 million	Support for the development of rice, corn and bean value chains	2013-2016	90%
PPI-3	FIDA	16 million	<p>Irrigation infrastructure development</p> <p>Support for production activities</p> <p>Access to markets and financial services for producers</p> <p>Capacity building</p>	2012-2017	60%

Food Security Improvement	European Union	26 million	Support for agricultural production Processing of agricultural products Institutional strengthening	2013-2016	90%
Support for value chains	IDB	17 million	Facilitate the emergence of commercial financing arrangements for selected projects Support for project environmental and social feasibility Incentives for new project proposals	2016-2019	5%
SPS	IDB/WB	16 million	Plant and animal health Institutional management	2016-2019	15%
Artisanal fisheries	IDB	16 million	Institutional support for fishermen's and seafood marketing associations Training of fishermen Co-financing of fishing equipment	2016-2021	5%

AVANSE	USAID	88 million	Support for the cocoa, banana, bean, corn and rice value chains Watershed management Enhancement of marketing channels Strengthening of institutional capacity	2013-2018	60%
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RESEPAG: Strengthening Public Agricultural Services; **PTTA:** Technology Transfer for Small Farmers Project in the North and Northeast

PMDN: Natural Disaster Mitigation Program; **SECAL:** Haiti Food Security project

PPI: Small-scale Irrigation Project; **PROGEBA:** Water management Program for the Artibonite Basin

SPS: Health Protection Services (Modernization of public plant and animal health services project)

AVANSE: Support for the Valorization of Agricultural Potential in the North and Economic and Environmental Security Project

